

between two carriers, and even if it were at any given time, changing market conditions would surely create imbalances over time. At the margin, these two carriers would make investment, pricing, and production decisions on the assumption that, for this service, all additional traffic must be terminated at a zero price even though the incremental cost of terminating this traffic is positive.

The conclusion that low incremental costs of interconnection justify zero interconnection rates is also misleading because of its efficiency consequences. A bill-and-keep policy of zero interconnection rates leads to an underpricing of interconnection by the actual amount of LRIC plus the Ramsey mark-up. Nowhere does Brock show why such underpricing is likely to lead to lower welfare losses than an alternative strategy, even one based on negotiation between carriers without regulation. Indeed, there is no efficiency reason for preferring a rate that is too low over one that is too high. Both distort the allocation of resources: prices above incremental cost induce too little consumption of the good or service in question while prices below incremental cost induce too much consumption of this item.⁸ Because the incremental cost of interconnection is positive, bill-and-keep results in rates that are too low regardless of the price elasticity of demand. All Ramsey prices must be in excess of LRIC unless the additional costs of metering and billing for usage are more than the cost of the interconnection itself.⁹

⁸ It is for this reason that competitive market equilibria produce an efficient allocation of resources. See Hal Varian, *Microeconomic Analysis*, 3d edition, Norton, 1992, Chapter 13.

⁹ For a discussion of the application of economic theory to telecommunications pricing, see Bridger M. Mitchell and Ingo Vogelsang, *Telecommunications Pricing: Theory and Practice*, Cambridge, 1991.

Current termination rates for cellular traffic generate a substantial amount of revenue for the LECs. If these rates were reduced to zero through the extension of bill-and-keep to all CMRS-LEC interconnection, the reduction in revenue would have to be offset by rate increases elsewhere to give LECs the opportunity to recover their costs. Some such rebalancing may be desirable, but it should be built into any plan to reduce current access charges and it surely should not go so far as to reduce LEC access-charge revenue from CMRS calls to zero. Rates of zero can only be optimal if incremental costs are zero or if the cost of collecting them exceeds the revenues that result. But incremental costs are not zero, and collection costs should not concern regulators; telephone companies have every incentive to decide without regulatory guidance whether revenue from a service exceeds the cost of collecting it.

The Incentive Effects of Bill-and-Keep

There are three related adverse incentive effects of instituting a policy of bill-and-keep: (1) it encourages competitors to seek out customers with a large share of originating traffic and to avoid customers with a large share of terminating traffic; (2) it subsidizes one technology at the expense of other, potentially more efficient technologies; and (3) it creates a disincentive to invest in switching capacity to terminate calls.

(1) If termination rates are set at zero for calls handed off from one carrier to another, it is obvious that carriers will attempt to attract customers who originate far more calls than

they receive. This is especially true for CMRS carriers that charge for origination and minutes of use on virtually every call. Because traffic on broadband CMRS systems is heavily weighted with calls from the wireless subscriber to LEC subscribers, the bill-and-keep policy subsidizes CMRS at the expense of the LECs and the LECs' subscribers and encourages the CMRS systems to seek customers whose traffic is primarily in this direction. The LEC, on the other hand, generally offers flat-rate local service to subscribers who have much less occasion to originate calls that terminate on CMRS systems.

(2) The subsidy that results from bill-and-keep flows principally to CMRS systems because of the imbalance of traffic between broadband CMRS systems and LECs. This subsidy, in turn, distorts investment choices between CMRS and wire-based systems and encourages over-investment in CMRS systems. The Commission may feel that such a subsidy is desirable as a means of "jump-starting" competition, but it cannot be confident in its ability to identify the most efficient sources of new competition. For instance, it is quite possible that cable television systems will have an advantage over CMRS systems in offering local telephony services, but these cable telephony systems would not enjoy the same degree of subsidy from bill-and-keep as would the CMRS systems. Indeed, bill-and-keep could well penalize cable telephony much as it surely would penalize existing LECs. The Commission should be wary of accepting "infant-industry" arguments for targeted subsidies as long as it cannot be sure which of the categories of new entrants is likely to be the most efficient. Attempting to pick winners in an industry with such rapid technical change is risky indeed.

(3) Finally, because the LECs terminate a large share of the CMRS-originated traffic, a bill-and-keep policy reduces the profitability of expanding peak-hour switching capacity. If the inbound traffic from the broadband CMRS systems provides no incremental revenue, it is obviously far less attractive for the LECs to invest in switching capacity. It also reduces the incentive for new wire-based local carriers, CLECs, to build capacity because they would be forced to assume some of the unbalanced CMRS-LEC traffic without compensation. The result may be a higher rate of blocked calls during busy hours, a degradation in the quality of service for all LEC customers, and a reduction in the degree of potential competition from wire-based local carriers.

Distortions in Current Interconnection Charges

Current cellular interconnection charges typically ignore the effects of volume and time of day and therefore are likely to be inefficient. The Commission has understandably raised these issues in its Notice and should proceed deliberately to address them in a comprehensive fashion.

Professor Brock suggests that the "average" long-run incremental cost of switching is about 0.2 cents per minute, averaged over busy and non-busy hours. This calculation is likely to be subject to considerable dispute, but it is indisputable that the peak-hour long-run incremental costs are far above the 0.2 cents per minute figure. Indeed, Brock uses a 2 cents per busy hour estimate in arriving at his 0.2 cents per minute average. Thus, even he would

be forced to admit that bill-and-keep rates are far below peak-hour long-run incremental costs, a result that is extremely adverse to economic efficiency.

Whatever the correct estimate for the costs of handling CMRS-LEC interconnections, the Commission should examine the effects and feasibility of allowing interconnection rates to vary by time of day. The current system of charging a single access charge for cellular-LEC interconnections is likely inefficient, creating incentives for too little off-peak use and too much busy-hour use. Off-peak costs are likely to be very low relative to peak-hour costs because most of the incremental costs of interconnection are the costs of amortizing the additional capacity that is needed only during peak hours. Therefore, unless off-peak rates are substantially lower than peak-hour rates, there will be too little consumption during these off-peak hours. Conversely, if peak-hour rates fail to reflect the full additional costs of capacity required to serve customers during these hours, peak-hour consumption will be too great. Even though access charges are a very small share of total cellular charges, these efficiency losses could be important unless the costs of administering a peak/off-peak pricing system are so large as to offset the efficiency gains. It should be noted that the rates cellular carriers charge customers already differ between peak hours and off-peak hours; the rates for terminating their calls or for the termination of calls on cellular systems should also differentiate between peak and off-peak periods. Of course, the structure of such differential rates and the transition to such rates will themselves require careful analysis.

Another issue arises from the possibility that there are economies in handling calls at

various times of the day that should be reflected in volume discounts. There are economies of scale in transmission and even in switching that could be reflected in the charges for interconnection. In fact, the costs of building peak-hour capacity could be defrayed in part by large CMRS users through a two-part tariff similar to that often employed in pricing other utility services, such as electricity. A demand charge for transmission and switching capacity could be established that reflects these economies with a fairly low usage charge for the traffic actually delivered to or from the LEC.

There is no doubt that a more efficient approach to setting interconnection rates than the one generally employed by LECs and CMRS providers could be devised. But a bill-and-keep policy that requires all termination charges to be zero -- even during busy hours -- is clearly inefficient.

Temporary Subsidies for CMRS

There is a long history of government subsidy programs designed as temporary stimuli for various activities. Some may be justified as a means for overcoming first-mover advantages, but many have little economic justification. The difficulty with all such programs is that the subsidized entities become accustomed to their favored treatment and therefore resist any attempts to reduce or end the subsidy programs. The current difficulties in ending subsidies for rural electricity, logging, shipping, cattle grazing, or farming are obvious cases in point. All of these programs have long outlived their original rationales, but none can be

phased out without enormous resistance. For this reason, it is crucial that the Commission establish the correct interconnection policy from the outset.

In this instance, the implicit subsidy to CMRS from a bill-and-keep interconnection policy is likely to be a small share of the CMRS systems' total costs. Even assuming that PCS can offer service for as little as 25 or 30 cents per minute, reducing interconnection charges from the average interstate Bell Atlantic level to zero would reduce rates by only 1.5 cents, a very small share of the PCS service's price. However, these subsidies would be built into the capitalized value of CMRS systems that change ownership over time, creating substantial pressures to make such "temporary" subsidies permanent.

Conclusion

The Commission would be ill-advised to pursue a new interconnection policy for CMRS systems without a careful examination of the impact of alternative policies on the entire regulated LEC rate structure. Rates should be based on long-run incremental costs and, in the appropriate circumstances, estimates of the price sensitivity of demand for various services. As long as the long-run incremental costs of interconnection are positive, however, bill-and-keep cannot be the premise of a sound interconnection policy, even on an interim basis. Such a policy would distort investment, pricing, and marketing decisions and is likely to slow progress towards competition in local-exchange markets by providing inefficient incentives for entry.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.



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